WHAT IS CLAIMED IS:

1. A method of producing an antireflection-coated substrate comprising a transparent substrate (1) and an antireflection film formed on the transparent substrate, the antireflection film comprising a multilayer film having a medium refractive index layer (2), a high refractive index layer (3), and a low refractive index layer (4) successively formed on the transparent substrate in this order, the medium refractive index layer being made of a material comprising silicon, tin, and oxygen, the high refractive index layer being made of a material comprising oxygen and at least one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being made of a material comprising silicon and oxygen, the antireflection film being formed by successively depositing these layers by an in-line sputtering apparatus.

2. A method according to claim 1, wherein the antireflection film is formed by sputtering or reactive sputtering in an inactive gas atmosphere or in a mixed gas atmosphere comprising an inactive gas and an oxygen gas, the medium refractive index layer being deposited by the use of target (10) made of a material comprising silicon and tin, the high refractive index layer being deposited by the use of a target (11) made of a material comprising one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being deposited by the use of a target (12) made of a material comprising silicon.

3. A method according to claim 2, wherein each of the medium refractive index layer, the high refractive index layer, and the low refractive index layer is deposited by the use of a plurality of targets.

4. A method according to claim 1, wherein the medium refractive index layer has a refractive index between 1.6 and 1.8 and a geometrical thickness

between 60 nm and 90 nm, the high refractive index layer having a refractive index between 2.1 and 2.8 and a geometrical thickness between 90 nm and 130 nm, the low refractive index layer having a refractive index between 1.4 and 1.46 and a geometrical thickness between 80 nm and 100 nm.

5. A method according to claim 4, wherein the medium refractive index layer comprises $Si_xSn_yO_z$, the high refractive index layer comprising a material selected from a group consisting of TiO_2, Nb_2O_5, Ta_2O_5, and HfO_2, the low refractive index layer comprising SiO_2.

6. A method according to claim 1, wherein the transparent substrate is a glass substrate having a refractive index between 1.46 and 1.53.

7. A method according to claim 6, wherein an antireflection-coated surface of the glass substrate on which the antireflection film is formed has a surface roughness of 0.5 nm or less as a center-line-mean roughness Ra.

8. A method according to claim 1, wherein a transparent conductive film is formed between the high refractive index layer and the low refractive index layer.

9. A method according to claim 1, wherein the antireflection-coated substrate is a dust-proof substrate for a liquid crystal panel.

10. A method according to claim 9, wherein the liquid crystal panel is a liquid crystal panel for a liquid crystal projector of a projection type.

11. A method according to claim 1, wherein the antireflection-coated substrate is a cover glass for a solid-state image pickup device.